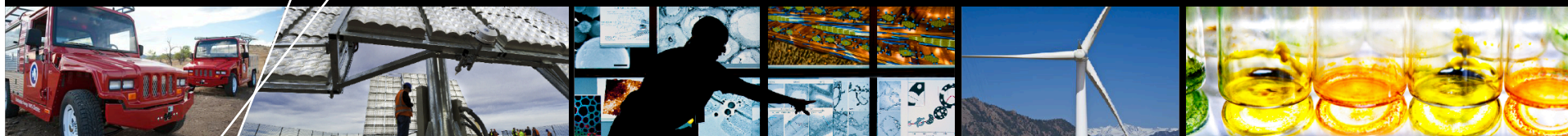




Western Wind and Solar Integration Study status update



Debbie Lew

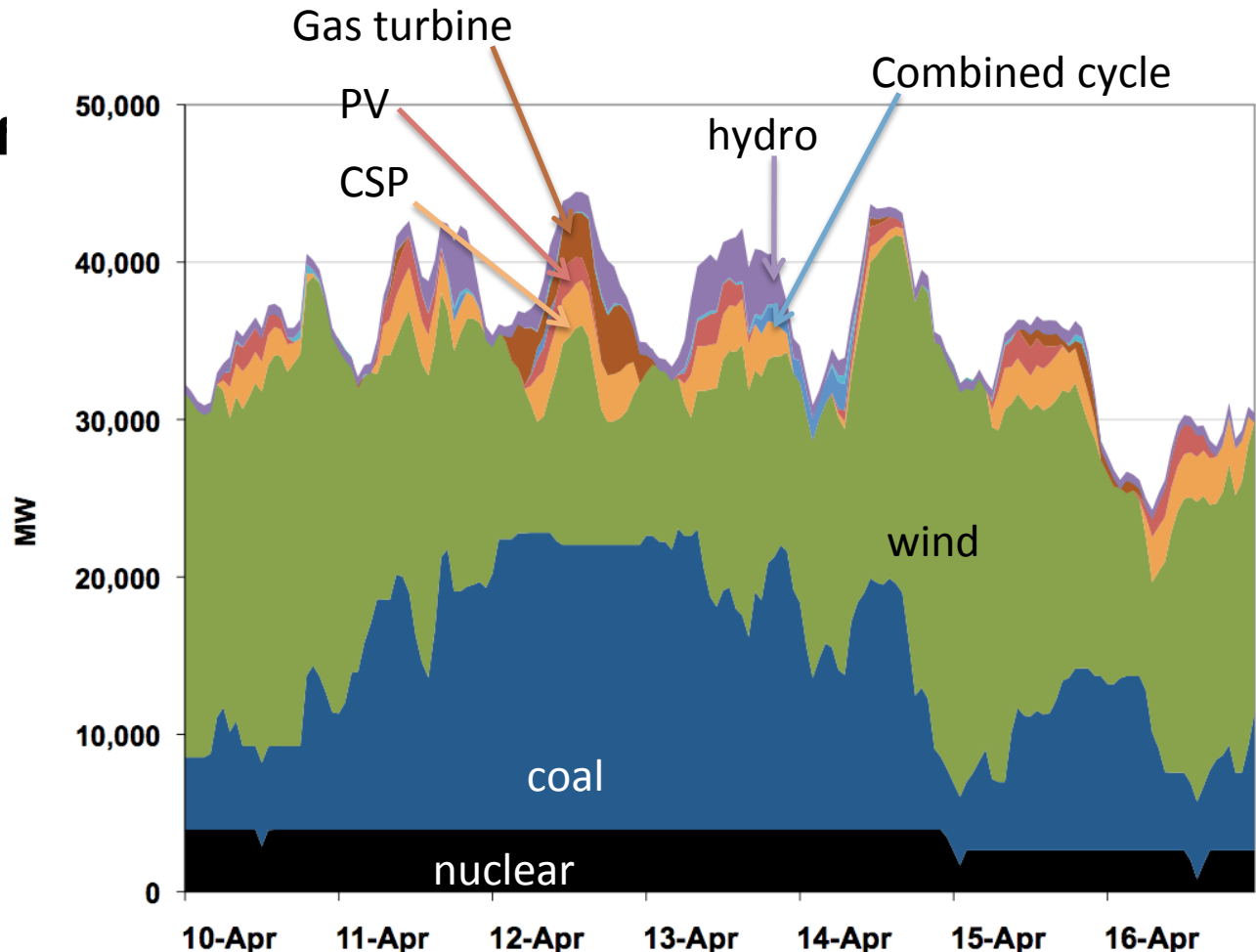
4/5/12

Western Wind and Solar Integration Study (WWSIS)

What are the impacts of high penetrations of wind and solar on the power system and conventional generators?

Phase 1 study at:

<http://www.nrel.gov/docs/fy10osti/47434.pdf>



Wind and Solar Datasets

- **Wind**

- Original wind dataset: 3-day seam fixed (Sep 2011)
- New 1 min wind dataset created (Mar)

- **Solar**

- New 1 min solar dataset created & validated (Jan)

- **Forecasts**

- Original wind & solar forecast datasets compared to current performance (Feb)
- Day-ahead wind forecast dataset revised (Mar)
- Day-ahead solar forecast dataset unchanged, but re-running power conversion
- Need for 1 hour, 4 hour-ahead forecasts – review today

Solar Dataset Checks

- Checked PV and CSP data for blips, increased variability artifacts, ramp histograms, spatial correlation, power curves
- Found data to be sound, with exception of increased variability in the 1 minute dataset at top of hour. This does not appear to be a significant problem at the 10 minute timescale. Also found increased variability in 7-8am timeframe that is being fixed.
- <http://wind.nrel.gov/public/WWIS/IbanezSolar.pdf>

Solar Dataset Validation

- **Validated dataset methodology against irradiance at 27 locations, considering distributions, ramps, spatial correlations**
- **Qualitative review of power conversion algorithm**
- **Results**
 - Suitable for use in WWSIS down to 10-15 min timescale. Spatial correlations are represented.
 - Could apply upper bound to simulated GHI, revise AZ bias and examine SLC and Seattle in detail.
 - DNI has bias
- **<http://wind.nrel.gov/public/WWIS/CliffSolar.pdf>**

Wear and Tear Costs and Emissions

- **APTECH completed cycling cost dataset (Nov 2011) and additional tasks (Mar). Report in mid-April.**
- **NREL completed emissions dataset (Nov 2011).**

Analysis

- **GE completed application of APTECH costs to WWSIS 1 (Feb). Report completed (Mar).**
- **NREL applied refined emissions data to WWSIS 1. Report in May – review analysis today**
- **Statistical analysis is underway – Jack King to review results today**

Plexos model

- **Scenarios defined and sited (Dec 2011).**
- **Retirements defined and resource adequacy addressed (Dec).**
- **Hydro flexibility and constraints determined (Dec).**
- **Determined reserve sharing, but reserves methodology to be discussed in working group (next 2 weeks).**
- **Transmission expanded for scenarios – review today.**

Near-term tasks

- **Statistical Analysis – end April**
- **Forecast datasets (1 hour, 4 hour, day-ahead) – mid April**
- **Reserves – working group call in next two weeks**
- **Sensitivities to finalize Plexos set up (DA/RT market; time horizons) – end April**
- **Start running core scenarios (reference, high wind, high solar, mixed intermediate) in May**
- **GE to help determine mitigation options and define sensitivity cases – May-July**

Reporting

- **APTECH subcontractor report on wear and tear costs**
- **GE subcontractor report on application of wear and tear costs to WWSIS1 results**
- **NREL technical report on emissions and application of emissions to WWSIS1 results**
- **WWSIS2 report on results – end Sept**

Contact info

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- **Working-level website for WWSIS2 project:**
- <http://wind.nrel.gov/public/WWIS>